**Food Hydrocolloids Trust Medal Lecture**

**Dietary Fibre for Glycemia Control: Towards a mechanistic understanding.**

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One of the many biological functionalities of dietary fibre when present in the human diet is its ability to reduce the rate of absorption of glucose after consumption of glycemic carbohydrate-containing foods, leading to a blunted blood glucose response curve and less demand for insulin. This has been demonstrated with many studies1 and is particularly related to the soluble fibres – the gums2. Glycemia (post-prandial blood glucose concentration) control through dietary intervention is very important for those with mild Insulin Resistance through to those with Type II Diabetes Mellitus, a population that is growing globally at an alarming rate3. The soluble polysaccharide gums are well known to induce viscosity and/or gelation in solution, and their physiological function is often related to this rheological behaviour. However, one has to also consider the role of gastrointestinal secretions and dilution, and acidification and re-neutralization, on the rheological properties of the polysaccharides *in vivo*.4 When one considers the physiology of starch and sugar digestion and glucose absorption, it is possible to elucidate several plausible mechanisms by which the soluble fibres might contribute to glycemia control: reduction in gastric emptying, inhibition of amylase activity and delayed starch hydrolysis, reduction in diffusion of amylolytic products to the small intestinal microvilli, and/or the development of an absorptive barrier layer through interactions with the mucosa. My lab group has sought over the last several years to test these mechanisms both *in vitro* and *in vivo*, and then to extend that knowledge to the identification and development of specific gums most capable of glycemia control and to the development of food products enriched in the appropriate soluble dietary fibres. Our results indicate that all of the mechanisms above are involved to some extent4-7. Delayed starch hydrolysis can clearly be demonstrated *in vitro* but our *in vivo* results suggest that gastric emptying and/or mucosal interactions are also significant to fibre functionality in glycemia control. It also appears that when matched for simulated small intestinal viscosity, gums of widely varying molecular structure, and hence concentration, behave similarly with respect to glycemia control. Understanding these relationships between molecular structure, physical functionality and physiological functionality should enable the food industry to deliver more fibre-enriched functional food products to consumers.

*References:*

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